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Research competencies of college students in a public higher education institution in Ilocos Sur, Philippines: Bases for a capacity building program

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Abstract

Research competencies are indispensable for students, contributing significantly to their future professional development and capacity for informed decision-making in their respective fields upon entering the workforce. This study determined the level of research competencies among students. It utilized a validated researcher-made test. Mean was used to determine their level of research competencies and strengths and weaknesses, further, ANOVA was utilized in identifying significant differences that existed between groups. It found out that students are good at identifying the problem, stating research questions and implementing data collection process. However, they are hard up in identifying the nature of inquiry, literature review and interpretation and presentation of results. It came to the conclusion that training programs were required to strengthen the students' identified areas of weakness. It recommended therefore that interventions such as the trainings programs should be implemented in order to enhance students' research competencies.

Keywords: research skills, students' competencies, training programs, professional development, intervention

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1. Introduction

Research is crucial in education, providing the foundation for evidence-based decision-making and advancing knowledge in a rapidly changing world. By engaging in research, students develop essential skills like problem-solving, critical thinking, and data analysis. These competencies are key to academic success and future careers, preparing students for higher education and real-world challenges. In today's fast-paced environment, research skills are increasingly important. Students who participate in research gain practical experience that bridges classroom learning and real-world application. According to Zhang (2020), adding a research component to education enhances students' learning experience and helps them navigate complex situations. To stay relevant, educational institutions must prioritize research, as studies such as those by Comon and Corpuz (2024) emphasize that research competence is necessary for adapting to ever-changing environments.

Research competencies include the skills and knowledge needed to conduct research effectively and ethically. As Robinson and Persky (2020) highlighted, gaining proficiency in research techniques also helps students become more self-directed learners. These qualities assist first-year college students in adjusting to the higher standards of higher education after high school. Competencies, including conducting independent research, critically assessing data, and effectively conveying findings, are essential for both professional and academic success. By giving students the chance to do research, educational institutions play a critical role in developing these abilities. This method encourages academic success and lifetime learning. Students' comprehension and proficiency of the course material are further improved by research, which also enables them to contribute to the creation of knowledge in their domains. Reviewing previous research, comprehending methodology, and effectively expressing findings are all examples of research skills.

Contrastingly, students' levels of research skill differ because of things like past training, resource availability, and technological familiarity. According to studies, students who have had formal instruction in research techniques or who are accustomed to citation styles like APA are more likely to be competent (Emelyanova et al., 2017). Enhancing research skills also requires having access to technology, such as citation management software and research databases (Joy et al. 2024), as affirmed by Rafiq et al. (2024). Moreover, motivation significantly influences research competence. According to Maddens et al. (2022), more motivated students have superior research abilities since their cognitive processes are improved. Yet, Cha et al. (2011) research competency varies across regions. For example, South Korean students typically excel in research due to their education system's emphasis on research skills (Roach, 2018). In contrast, research competency in the U.S. varies widely, with STEM students often outperforming those in the humanities (Owston et al., 2020).

This study is based on Kolb's Experiential Learning Theory from 1984. As mentioned by Baker and Robinson (2016), learning is a process that repeats, involving concrete experience, reflective observation, abstract thinking, and active experimentation. It argues that people learn best when they engage with their experiences, think about them, and apply what they learn to new situations. In terms of research skills, this means that students improve their research abilities not just through classroom teaching, but also through hands-on research activities, mentoring, and reflective practices. Following this idea, the study sees the growth of research skills as an experiential process that can be improved through structured programs aimed at providing real research exposure and ongoing learning opportunities (Kolb, 1984).

In the Philippines, research skills need improvement. Sismondo (2020) noted that while Filipino Grade 12 students show satisfactory research competence, they require further development. Graduate students also face challenges such as inadequate training, limited resources, and heavy workloads (Magnaye & Malabarbas, 2022).

Factors like lack of instruction, limited technology access, and poor writing skills also contribute to low research competence (Bilgiler et al. n.d.), which was corroborated by Talle et al. (2023).

Given these challenges, studying research competencies among tertiary students is essential. By identifying the gaps in students' skills, educational institutions can implement targeted interventions. A capacity-building program could help by offering workshops, seminars, and training focused on research methodologies, data analysis, academic writing, and ethics. Such a program would empower students to become proficient researchers, contributing to national development and the overall quality of education. This study aimed to assess the level of research competence of students at ISPSC-Main Campus in terms of the nature of inquiry and research, problem identification, literature review, data understanding and collection, and deriving answers from data. It also sought to determine differences across colleges, identify students' strengths and weaknesses in research, and propose a validated training program to enhance their competencies.

2. Materials and Methods

This study employed a quantitative approach, utilizing a descriptive-comparative research design to assess students' research competencies. This method was chosen to compare different groups without manipulating variables, and a descriptive-developmental design was also used to gather data for developing a training program. The sample consisted of 361 students from 5,928 enrollees during the second semester of 2023-2024, selected using multistage sampling, starting with stratified sampling and followed by random sampling across various colleges. A 50-item researcher-made test was developed to measure competencies in areas related to the nature of inquiry and research, identifying the inquiry and stating the problem, learning from others and reviewing the literature, understanding data, and ways to systematically collect data and finding answers through data collection. The test was validated by experts and pilot-tested, achieving a validity score of 4.83 and a reliability score (KR-20) of 0.84, both interpreted as "very high." The test was administered through Google Forms, ensuring voluntary participation, informed consent, anonymity, and adherence to ethical research practices. Statistical treatments included using the mean to assess the level of research competence and strengths and weaknesses, and ANOVA to identify significant differences across the five key research areas. Scheffe's post-hoc test was applied to determine which differences were significant. The Capacity Building Program was developed based on the findings of the study to address the identified strengths and weaknesses of students in research. It was validated by experts and obtained a very high level of face and content validity, which means the program is functional, acceptable, appropriate, timely, implementable, and sustainable.

3. Results and Discussion

Problem 1. What is the level of research competence among students along: Nature of Inquiry and Research; Identifying the Inquiry and Stating the Problem; Learning from Others and Reviewing the Literature; Understanding Data and Ways to Systematically Collect Data and Finding Answers through Data Collection?

Table 1
Level of research competency of the respondents

College	1		2		3		4		As a Whole	
Indicators	$\bar{x}$	*DL*	$\bar{x}$	*DL*	$\bar{x}$	*DL*	$\bar{x}$	*DL*	$\bar{x}$	*DL*
1. Nature of Inquiry and Research	3.53	Fair	4.01	Good	4.57	Good	4.18	Good	3.91	Fair
2. Identifying the Inquiry and Stating the Problem	4.10	Good	4.49	Good	5.32	Good	4.45	Good	4.42	Good

3. Learning from Others and Reviewing the Literature	3.76	Fair	3.84	Fair	4.92	Good	3.65	Fair	3.91	Fair
4. Understanding Data and Ways to Systematically Collect Data	4.00	Fair	4.31	Good	5.28	Good	3.85	Fair	4.20	Good
5. Finding Answers through Data Collection	3.51	Fair	3.93	Fair	4.47	Good	3.36	Fair	3.70	Fair
As a whole	18.90	Fair	20.56	Good	24.55	Good	19.49	Fair	20.14	Good

Legend:

Scores (10 items)	*As a Whole*	*Interpretation*
8.01-10.00	*40.01-50.00*	*Excellent (E)*
6.01-8.00	*30.01-40.00*	*Very Good (VG)*
4.01-6.00	*20.01-30.00*	*Good (G)*
2.01-4.00	*10.01-20.00*	*Fair (F)*
0.00-2.00	*0.00-10.00*	*Poor (P)*

The study revealed that the overall research competency of respondents was rated as "Good," with a mean score of 20.14. Students demonstrated proficiency in defining research problems, gathering and analyzing data, and understanding research designs and sampling procedures. However, their competency was only satisfactory in formulating research questions and conducting data collection processes, indicating room for improvement. This implies that students had some understanding of where and how to identify their research problems. They knew about issues in their context and could find real problems, often with help from guides in shaping their research questions. It can be said that many students had limited exposure to scholarly literature; they often found it difficult to connect the issues they observed in their context with existing theories or research gaps. This made their problem statements appear less academic in depth. Their struggles may also come from a lack of practice, minimal guidance, the pressure of deadlines, and even the natural uncertainty and lack of confidence that come with being novice researchers. Similarly, while they were aware of basic data-gathering techniques, they did not have effective strategies to implement them. There were often inconsistencies between the stated research problem and the data-gathering tools they used. These challenges point to the need for more supportive and comprehensive training that can help students learn how to frame problems in a scholarly way, think more critically, and align their chosen research problems with the right methods.

In specific areas like "Nature of Inquiry and Research," "Learning from Others and Reviewing the Literature," and "Finding Answers through Data Collection," students displayed only a "fair" level of competence. This reflects a moderate understanding of research principles and methodologies, with gaps in selecting relevant literature, ethical writing, and using statistical techniques for data interpretation. Students also struggled with reviewing related studies and presenting research findings. This shows that students already have some basic research knowledge, but their skills are not yet strong enough to reach higher academic standards. Being rated only at a “fair” level means that while they can do simple research tasks, they find it difficult to go deeper and produce more scholarly work. Many of them struggle to choose the right literature and review related studies, likely because they have had limited practice in reading and summarizing academic articles. Writing also becomes a challenge, especially when it comes to citing sources correctly, paraphrasing ideas, and avoiding plagiarism. On top of that, statistics and presenting findings clearly remain difficult areas, showing the need for more hands-on training and guidance.

Overall, the results show that students need more chances to practice, structured support, and consistent mentoring to improve their skills in reading, writing, analyzing, and presenting research with confidence. The teachers and research advisers should create learning activities and mentoring programs that offer guided research experiences and constructive feedback. For students, this means it is important to actively participate in research-related tasks and seek ongoing improvement to build their skills and confidence in conducting scholarly work.

These findings align with Chigbu et al. (2023), who identified citing related literature as a difficult task, and Grana (2021), who noted challenges in communication and content knowledge. The study further echoes Dewey’s

educational philosophy, which emphasized that meaningful, hands-on research experiences are key to developing deeper research competencies. This exemplifies a need for practical research opportunities to enhance both theoretical and applied understanding.

Problem 2. Is there a significant difference between the level of research competence of students along the Nature of Inquiry and Research; Identifying the Inquiry and Stating the Problem; Learning from Others and Reviewing the Literature; Understanding Data and Ways to Systematically Collect Data and; Finding Answers through Data Collection in each college?

Table 2
ANOVA results on the significant difference in the level of research competence of the respondents

College	$\bar{x}$/DL	p-value	Remarks
1	18.90 (F)	0.001	Significant
2	20.58 (G)		
3	24.55 (G)		
4	19.49 (F)		

Significant if p<0.05

The table presents the significant differences that existed between the level of research competence among the four colleges. The computed p-value of 0.001 is less than 0.05; this means that the null hypothesis stating that there is no significant difference in the level of research competencies of the respondents is rejected. It is evident that colleges 3 and 2 have a higher mean score of 24.55 and 20.58, respectively, compared to colleges 4 and 1, with a mean score of 19.49 and 18.90, respectively, described as “fair”. It can be implied that students in colleges 2 and 3 were given more chances to take part in research activities like colloquiums and congresses. Their instructors or advisers may have also been more present, meeting them regularly, checking their manuscripts, and giving continuous support. The curriculum in these colleges might also give more focus to research writing and practice, which helps students become more confident. On top of that, students may feel more motivated because their efforts are rewarded, recognized, and valued, showing that research has a stronger place in the culture of these colleges.

With this analysis, a post hoc analysis was conducted. With corresponding p-values of 0.040 and 0.028, colleges 3 and 4 demonstrated noticeably greater proficiency levels than college 1 in the field of nature of inquiry and research. The students in colleges three and four are better at coming up with research titles that are pertinent to their areas, demonstrating a greater comprehension of their subject matter and the value of research. The research agenda was properly set and followed. It was made known to both the institution and the students, giving the latter a clearer perspective on what titles or problems could be developed. Furthermore, the students were in situations where they personally observed or experienced the problems themselves. Truly, when students choose research topics that they have personally experienced or observed, the work becomes more meaningful to them. They can connect with the problem on a deeper level, which helps them see its importance and relevance more clearly. Studies on lived experiences also show that when people do research based on their own context, they can ask better questions and explain the issues more accurately. This makes their problem statements stronger because they are grounded in real situations they know well, rather than being based only on abstract ideas or secondhand information. Their credibility as researchers is increased by their capacity to match titles with scholarly interests and personal experience. This corroborates Sinfiled (2023), who stresses the significance of considering students' experience, intelligence, and motivation when engaging them in research. Additionally, Walkington and Bernacki (2014) emphasized that the knowledge and drive required for meaningful studies are fostered by study topics that relate to the researcher's experience, interests, or areas of expertise.

In identifying the inquiry and stating the problem, all colleges demonstrated commendable competency, especially in designing research, formulating titles, providing background information, and articulating research

questions, with a grand mean score of 4.42. However, students from college 3 outperformed those from college 1, supported by a significant p-value of 0.000. When a person has actually seen a problem or gone through it themselves, they can talk about it in a clearer and more meaningful way. Because they truly understand what it feels like, they can explain the issue in detail and even connect it better to what other studies have already found. An individual with firsthand experience can imagine what needs to be done, predict what might happen, and plan their research in a way that makes sense. This makes their work more grounded, practical, and relevant because it comes from real situations, not just from theory or secondhand accounts. This means that college 3 students excel in creating relevant research titles, supplying substantial background information, and developing specific, measurable, achievable, relevant, and time-bound research questions, consistent with Real's (2023) findings on research competency at the Philippine School Doha, Qatar.

In learning from others and reviewing the literature, three of the four colleges exhibited a "fair" level of research competency. Notably, students from college 3 outperformed those from college 1, as shown by a significant p-value of 0.022. Despite this, most students across all colleges struggle with literature reviews, which are perceived as complex and time-consuming tasks that require thoroughness. This observation aligns with Real's findings, where respondents revealed that citing related literature was a significant challenge.

Table 4
Post-Hoc analysis of the significant difference in the level of research competence existed between groups of respondents

	Pairing per College		p-value	Remarks
Nature of Inquiry and Research	1	2	.249	Not Significant
		3	.040	Significant
		4	.028	Significant
	2	3	.736	Not Significant
		4	.841	Not Significant
	3	4	.990	Not Significant
Identifying the Inquiry and Stating the Problem	1	2	.180	Not Significant
		3	.000	Significant
		4	.211	Not Significant
	2	3	.139	Not Significant
		4	.990	Not Significant
	3	4	.128	Not Significant
Learning from Others and Reviewing the Literature	1	2	.961	Not Significant
		3	.022	Significant
		4	.998	Not Significant
	2	3	.115	Not Significant
		4	.993	Not Significant
	3	4	.069	Not Significant
Understanding Data and Ways to Systematically Collect Data	1	2	.873	Not Significant
		3	.000	Significant
		4	.692	Not Significant
	2	3	.011	Significant
		4	.374	Not Significant
	3	4	.000	Significant
Finding Answers through Data Collection	1	2	.617	Not Significant
		3	.069	Not Significant
		4	.996	Not Significant
	2	3	.555	Not Significant
		4	.593	Not Significant
	3	4	.081	Not Significant

Significant if $p < 0.05$

Regarding understanding data and ways to systematically collect data, analysis revealed significant differences in competency levels among the colleges. Students from college 3 demonstrated superior skills in selecting appropriate research designs, implementing suitable sampling techniques, developing valid research instruments, and adhering to data collection protocols, as indicated by p-values of 0.000, 0.0011, and 0.000 compared to colleges 1, 2, and 4, respectively. Students from College 3 showed that they really understood the different research designs—when to use them, how they work, and the best approach for a given study. This was

likely because their instructors and advisers took time to emphasize these lessons and guide them well, being research experts themselves. Because of this, the students also learned how to choose the right sampling techniques, whether probability or non-probability, and they were able to identify reliable people to validate their tools. With this strong guidance, they managed to carry out their data collection smoothly and effectively. It shows that the students from college 3 not only developed higher research skills but also benefited from a strong culture of research in their college, where learning, practice, and mentorship come together.

Finally, the analysis revealed no significant differences among the colleges in finding answers through data collection, indicating a collective "fair" proficiency in data collection, presentation, interpretation, and final report finalization. Many students found data collection to be one of the hardest parts of doing research. It wasn't just about gathering information—it meant following strict ethical rules, writing formal letters, asking permission from authorities, and talking to participants. For beginners, these tasks felt intimidating and sometimes overwhelming. They also struggled with presenting their results properly. Some were unsure how to format tables, while others had difficulty using charts or graphs to make their findings clearer. Interpreting results was another challenge. Even the basic step of reading tables and explaining what the numbers meant was not easy for them, and connecting those findings to real implications or other studies felt even harder. Additionally, preparing the final report brought a lot of stress. Many lacked the technical skills needed to format documents, polish their writing, and organize their work into a professional-looking paper. All of these struggles showed that while students were eager to learn, they still needed more practice, guidance, and support to build confidence in every step of the research process. This finding contradicts Real's study in which the respondents reported higher proficiency in summarizing findings and formulating conclusions, labeling those tasks as "easy." Consequently, enhancing skills across all colleges could be a key area for improvement.

Problem 3. What are the strengths and weaknesses of students in research per college and as a whole?

Table 5
Strengths and weaknesses of students in research per college and as a whole

College	**1**		**2**		**3**		**4**		**As a Whole**	
Indicators	$\bar{x}$/DL	Remarks	$\bar{x}$/DL	Remarks	$\bar{x}$/DL	Remarks	$\bar{x}$/DL	Remarks	$\bar{x}$/DL	Remarks
1. Nature of Inquiry and Research	3.53/F	W	4.01/G	S	4.57/G	S	4.18/G	S	3.91/F	W
2. Identifying the Inquiry and Stating the Problem	4.10/G	S	4.49/G	S	5.32/G	S	4.45/G	S	4.42/G	S
3. Learning from Others and Reviewing the Literature	3.76/F	W	3.84/F	W	4.92/G	S	3.65/F	W	3.91/F	W
4. Understanding Data and Ways to Systematically Collect Data	4.00/F	W	4.31/G	S	5.28/G	S	3.85/F	W	4.20/G	S

5. Finding										
Answers through Data Collection	3.51/F	W	3.93/F	W	4.47/G	S	3.36/F	W	3.70/F	W

Legend: S – Strength W – Weakness

This study evaluated the strengths and weaknesses of participants in research competencies, categorizing strengths as 'good' or above, while any ratings below this threshold were considered weaknesses. The findings revealed that students excel in identifying questions and understanding the problems they are trying to solve, as well as in organizing information gathering. However, they have trouble understanding the nature of inquiry and the research process, though, which includes how crucial it is to study the literature and correct methodology in order to arrive at evidence-based conclusions. In fact, Choy (2014) looked at the strengths and weaknesses of both qualitative and quantitative research methods in the social sciences. In one quantitative study he examined, the researchers had used a small purposive sample rather than a larger, more representative group, and the sites they chose did not properly reflect the area being studied. Because of this, the respondents were not well selected, which affected the results and led to errors in the findings. This shows how mistakes in the research process, especially in sampling and methodology, can have a big impact on the accuracy and reliability of a study.

This significant finding would help identify areas that require attention and further aid or training for students. By pointing out these issues, educators and administrators can develop specific programs to refine these overall research skills. Recognizing the various weaknesses of students would enable educational bodies to adjust teaching approaches and resources to come up with higher-quality research products. In addition, thorough training in research methods must be provided because most of the students lack skills such as conducting surveys, learning from others, or consulting literature. Literature review skill is emphasized to help students set their work in the relevant academic discussions and derive new ideas. Moreover, the challenges that arise in collaborative learning environments emphasize the need to encourage peer-to-peer learning and mentorship opportunities. An interactive academic environment promotes knowledge sharing and skill development.

Students can utilize these to improve their research abilities, which will help them in their future academic and professional endeavors. Academic institutions foster the development of strong researchers who ultimately contribute to the advancement of society through innovative ideas and discoveries by providing their students with suitable, inclusive research training, support, and resources. Finding strengths and weaknesses would be necessary to better guide research training designed to develop students' holistic competencies, with an emphasis on teamwork as well as a specific set of skills in data analysis and literature evaluation. A better research community will be the outcome of ongoing evaluation and improvement of these strategies. With these, a training program is hereby proposed to combat the weaknesses of students and further enhance the strengths identified.

Problem 4. What training program may be proposed to enhance/sustain the research competencies of students in ISPSC-Main Campus? ***What is the level of validity of the training program along: a. face; and b. content?***

The training program to enhance or sustain students' research competencies was designed to go beyond teaching theories and to guide them through the actual process of doing research. It focused on helping students learn how to clearly identify and articulate research problems, choose the right designs and methods, and gather data ethically and effectively. Since many students struggled with data collection, analysis, and interpretation, the program included plans for hands-on, face-to-face workshops where they could practice using research tools, presenting results in tables and graphs, and making sense of their findings. It also emphasized strengthening technical writing and presentation skills so students could confidently organize their papers, cite sources properly, and communicate their work. More importantly, the program aimed to nurture a culture of research by providing opportunities for participation in colloquiums, forums, and publications. In this way, students' skills were expected to improve and be sustained as they progressed academically and professionally.

Table 6
Level of validity of the training program

Level of Validity	Weighted Mean	Descriptive Equivalent
Face	5.00	Very High
Content		
Functionality	5.00	Very High
Acceptability	5.00	Very High
Appropriateness	5.00	Very High
Timeliness	5.00	Very High
Implementability	4.67	Very High
Sustainability	4.67	Very High
Average	4.67	Very High
Overall Rating	**4.86**	**Very High**

Legend: Descriptive Level (DL). 4.21-5.00 Very High (VH), 3.41-4.20 High (H), 2.61-3.40 Average (A), 1.81-2.60 Low (L), 1.00-1.80 Very Low (VL).

It can be seen from the table that the level of face and content validity of the proposed research training program, as perceived by the validators, was very high. This means that the proposed program is highly functional, acceptable, appropriate, timely, implementable, and sustainable. It can be implied that the proposed research training program is well-prepared and practical for use. The validators affirmed it as useful, acceptable, and appropriate, noting that it responds to the current needs of students and can be implemented effectively. They also recognized its potential to last and create long-term benefits. This shows that the program has strong potential to improve students' research skills and can be carried out with confidence.

4. Conclusion

Overall, the students showed an average level of research competence. They were able to identify research problems that were relevant to their own contexts, often because they had personally observed or experienced them. This gave their work meaning and direction, though many still found it difficult to frame these problems in a scholarly manner. Students also showed familiarity with different research designs, approaches, and sampling techniques—evidence of the strong mentoring and active research culture that stands out in colleges 2 and 3. At the same time, there were areas that students found most challenging. Data collection was one of the weakest skills, as it requires ethical clearances, formal permissions, and direct interaction with participants—processes that can be daunting for beginners. Many also struggled with presenting and interpreting results, especially in formatting tables, creating charts, and drawing accurate conclusions. Final report writing further tested their technical skills. While the foundation is already strong, these challenges highlight the need for continued guidance and practical training. Through a capacity-building program, students will be better equipped to transform their knowledge into confident research practice and contribute meaningfully to a stronger research culture in their colleges.

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